

TITLE

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## CHILD CARRIER ATTACHMENTS FOR BICYCLES

BACKGROUND OF THE INVENTIONField of the Invention

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The present invention relates to child carrier attachments for bicycles, and to bicycles provided with child carriers.

Description of the Related Art

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There have, in the past, been various proposals for attaching a seat for a child to a bicycle.

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Many of the prior proposals involved mounting the seat above the rear wheel of a bicycle, behind the saddle. However, such an arrangement has various disadvantages. Thus, for example, a child seated behind the saddle of a bicycle has its view largely obstructed by the rider of the bicycle, and the weight of the child over the rear wheel of the bicycle complicates the riding of the bicycle. Also, it is difficult for the rider to mount or dismount and, while riding, the rider is unable to observe the child.

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The prior art also includes various proposals for mounting a child carrier between the saddle and the handle bars of the bicycle. This location of the seat has the advantages that the child can have a good view forwardly of the bicycle and is given a sense of security by being located between the arms of the rider, while the rider can observe the child.

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In the present inventor's United States Patent No. 5,104,188, issued April 14, 1992, there is disclosed a bicycle seat for a child which, when provided on a man's bicycle, is mounted on the cross-bar of the bicycle by means of a tightener located below the seat

and engaging the underside of the cross-bar. When used with a women's bicycle, which lacks a horizontal cross-bar, it is necessary to mount the seat on a separate bar, which is clamped to the steering post of the bicycle at one end of the bar, the opposite end of the bar being hingedly connected to a vertical post secured to a diagonal bracing bar forming part of the frame of the bicycle.

The present inventor has found, by practical experience, that it is desirable to be able to support the child carrier without attaching it to the horizontal cross-bar of a man's bicycle frame, because brake and derailleur cables usually extend along the horizontal cross-bar of a man's bicycle frame and, also, because the tubular components of bicycle frames vary considerably in diameter, length and angle.

In United States Patent 4,305,532, issued December 15 1981 to John F. Reminger, there is disclosed a bicycle carrier having an elongate support which is formed, at opposite ends, with notches for receiving the front post and the saddle post of a bicycle. This carrier is intended, in particular, to be attachable to a bicycle without the use of tools, and is provided at its rear end with a slidable rear member. The slidable rear member is formed with a notch for receiving the saddle post and is intended to be slid rearwardly, relative to the support, so as to locate the saddle post in the notch in the slidable rear member when the carrier is attached to a woman's bicycle. When it is attached to a man's bicycle, the slidable rear member is removed. In that case, the support is mounted on the cross-bar of the man's bicycle, with projections on the underside of the support engaging the cross-bar, and with the notches in the opposite ends of the support slid into engagement with the front post and the saddle post of the bicycle.

The carrier disclosed in the aforesaid United States patent 4,305,532 is particularly intended to be installed on and removed from a bicycle without the use of tool. When it is being installed onto a man's bicycle, therefore, it is simply pushed into position, and must therefore be of a predetermined length to fit a predetermined bicycle frame size. The

notches at opposite ends of the carrier are of fixed width and are not adjustable to fit tubular bicycle components of various sizes. This prior art carrier is therefore not adjustable to fit bicycles of different sizes.

5 It would be apparent that in either case, the support is only loosely secured to the bicycle frame, and consequently there is a risk that it may easily be displaced from the frame when the bicycle it is for example subjected to an impact or a more or less violent movement by the child while in motion or when the rider of the bicycle is mounting or dismounting from the bicycle or when the rider is installing the child in, or removing the  
10 child from, the carrier. In connection with the latter, it will be appreciated that the rider must somehow support the bicycle while lifting a child into or from the carrier. This is often an awkward manoeuvre, accomplished by leaning the bicycle against the riders body. The child will often wriggle while being lifted. It is therefore very important that the carrier should be fixedly connected to the bicycle instead of being only loosely  
15 attached.

### BRIEF SUMMARY OF THE INVENTION

It is accordingly an object of the present invention to provide a novel and improved child carrier attachment for a bicycle which is readily adaptable to different bicycle frame sizes and which avoids any necessity for clamping onto the horizontal cross-bars of men's  
20 bicycle frames, but which is also fixedly attachable to the bicycle.

According to the present invention, a child carrier attachment for a bicycle comprises a  
25 support device and a child seat mountable on the support device, the support device comprising an elongate support, and front and rear clamping devices on the elongate support, the rear fastener being adjustable into gripping engagement with a saddle post of the bicycle, the front fastener being adjustable into gripping engagement with a front post

of the bicycle, and the support device being adjustable to vary the spacing of the front and rear fasteners.

With this attachment the support device can be adapted to different frame sizes by varying the spacing of the front and rear fasteners. Also, since the front and rear fasteners are engagable with the front post and the saddle post, respectively, of the bicycle, any brake and derailleur cables extending along the bicycle frame are not damaged by securement of the child carrier attachment to the bicycle and do not obstruct the securement of the child carrier attachment to the bicycle.

By means of the front and rear clamping devices, the support is fixedly connectable to the bicycle and therefore cannot be dislodged by toppling of the bicycle or by movement of the bicycle and/or of a child as the child is lifted into or from the carrier.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be more readily understood from the following description of a preferred embodiment thereof given, by way of example, with reference to the accompanying drawings, in which:

Figure 1 shows a view in perspective of a child carrier attachment embodying the present invention mounted on parts of a bicycle;

Figure 2 shows a view in side elevation of the child carrier attachment of Figure 1;

Figure 3 shows an exploded view, in perspective, of components of a support device forming part of the child carrier attachment of Figures 1 and 2;

Figure 3A shows a view in perspective of a pair of spacers forming parts of a rear clamp shown in Figure 3;

Figure 4 shows parts of the bicycle of Figure 1 with the support device of Figure 3 secured to it, but with other components of the child carrier attachment omitted;

Figures 5A and 5B show views in perspective of a seat mounted in different positions on the support device of Figure 3;

Figure 6 shows a view in vertical longitudinal cross-section through the child carrier attachment of Figure 1;

Figure 7 shows an enlarged portion of Figure 6 to illustrate interengagement of the headrest attachment and the seat;

Figure 8 shows a view in perspective of the seat mounted on the support device and the headrest attachment mounted on the seat;

Figure 9 shows a view in perspective of the seat and the headrest attachment being being mounted on the support device on a bicycle frame;

Figure 10 shows a broken-away view, in perspective, of parts of the headrest attachment and the seat secured together by a fastener.

#### DESCRIPTION OF THE PREFERRED EMBODIMENT

Figures 1 and 2 of the accompanying drawings show a child carrier attachment comprising a child's seat, indicated generally by reference numeral 10, a headrest indicated generally reference numeral 12, and a support device indicated generally by

reference numeral 14. The support device 14 is, in turn, mounted on a bicycle frame a part of which is indicated generally by reference numeral 16.

5 The support device 14 is shown in greater detail in Figure 3 and comprises an elongate support formed by front and rear support bars 17 and 18 in the form of steel channel members having inverted U-shaped cross-sections.

10 The rear support bar 18 has a front end 20 which is slidable within a rear end 22 of the front support bar 17, and is provided at its rear end 24 with a rear or saddle post clamping device indicated generally by reference numeral 26, while the front support bar 17 is provided, at its front end 28, with a front or steering post clamping device indicated generally by reference numeral 30.

15 More particularly, the rear end 24 of the rear support bar 18 is formed with two rearwardly projecting strip-shaped arms 32, onto each of which fit a pair of resilient spacers 34 which are of hollow rectangular cross-section. As shown in Figure 3A, the spacers 34 have opposite walls 35 and 37, which have different thicknesses.

20 A pair of threaded members in the form of bolts 36 extend through holes 38 in the arms 32, through resiliently compressible cylindrical sleeves 40 positioned between the arms 32 and through washers 42 into threaded engagement with retainers in the form of nuts 44. The bolts 36 can be tightened to bring the rear clamp 26 into gripping engagement with a saddle post 46 (Figure 2) installed in a gap between the spacers 34 on the arms 32. By repositioning the spacers 34 on the arms 32 to position the thicker or thinner walls of  
25 the spacers 34 adjacent the saddle post 46, or by omitting the spacers 34, the width of this gap can be adapted to the diameter and the inclination of the saddle post 46.

The front support bar 17 is adjustably secured to the rear support bar 18 by means of a fastener comprising a hexagonal bolt 48, a hexagonal nut 49, an external tooth washer 50

and a fender washer 51, the bolt 48 extending through a circular hole 52 in the front support bar 17 and through a longitudinal slot 54 in the rear support bar 18. With this arrangement, the support device 14 is adjustable, by relative longitudinal sliding of the front and rear support bars 17 and 18, to vary the spacing between the front and rear clamps 30 and 26.

The front clamp 30 comprises a forwardly open yoke 56 formed on the front end 28 of the front support bar 17 and a U-clamp bracket 57, opposite ends of which are secured to the arms of the yoke 56 by fasteners comprising screws 58 and nuts 60, provided with external tooth washers 61. Curved spacer members or collars 63 of resilient material are provided between the bracket 57 and the yoke 56 for gripping engagement with a head tube or steering post 62 forming part of the bicycle frame, and the thickness of these collars 63 may be selected to suit the diameter of the post 62 so as to ensure a tight fit. As can be seen in Figure 6, the front clamp 30 is angled, relative to the support bar 17, to suit the inclination of the steering post 62. This permits full surface contact between the collars 63 and the steering post 62, thus providing a high clamping force and counteracting any risk of the support bar being deformed, dislodged or rotated under reasonable impact forces.

Figure 4 shows the support device 14 mounted on the bicycle frame 16, with the rear fastener 26 in gripping engagement with the saddle post 46 and with the front fastener in gripping engagement with the front or steering post 62 of the bicycle frame 16.

With the support device 14 thus secured to the bicycle frame 16, the bicycle can be ridden without the seat 10 and the headrest attachment 12.

Figures 5A and 5B show the seat 10 mounted on, but not yet secured to, the support device 14. The seat 10 is formed as a molding with a seat back 64 and with a pair of upwardly and laterally outwardly open foot boxes 65 for receiving the feet and legs of a

child on the seat. To protect them. The width of the seat 10 is preferably limited to e.g. nine inches in order to avoid interference with the rider's legs.

The seat 10 is formed with a slot 88 (Figures 5A and 5B) for receiving a bolt 68, which extends through a washer 69 (Figure 9) and an opening 70 in the front support bar 17 into threaded engagement with a self-clinching fastener 71 (Figure 6). The fastener 71, which is manufactured and sold under the trade name PEM by Penn Engineering and Manufacturing Corp., is inserted into a hole in the front support bar 17 and then compressed, in known manner, into locking engagement with the front support bar 17. By these means, the seat 10 is longitudinally adjustably secured to the support device 14 so as to be movable between a rearward position, relative to the front support bar, in which the seat is shown in Figure 5A with the support device 14 fully extended, and a forward position, relative to the front support bar, as shown in Figure 5B, which also shows the support device 14 fully extended.

Figure 7 shows the headrest attachment 12 during its assembly on the seat 10. As can be seen in Figure 7, the headrest attachment 12 is formed with a pair of projecting tongues 72 which are engagable in slots 74 in the seat 10, and also with a longitudinal slot.

Figure 8 shows the headrest attachment 12 mounted on the seat 10 which, in turn, is mounted in the support device 14, and Figure 9 further shows these components in relation to the bicycle frame 16.

Figures 1 and 2 also illustrate a safety harness, indicated by reference numeral 76, which is secured to the seat 10. This safety harness 76 has been omitted from the other figures to facilitate illustration of the child carrier attachment.

The safety harness 76 has a pair of shoulder straps 77 and a waist strap 79. The waist strap 79 passes from within the seat 10 rearwardly through a pair of slots in the seat back



64 and then forwardly around the exterior of the seat back 64 through loops in the lower ends of the shoulder straps 77 to a waist buckle. This arrangement of the safety harness has been found to be particularly suitable for allowing the child sufficient slack to move comfortably and to rest on the headrest attachment 12 while also preventing the child from falling to the side of the seat 10, and from standing or moving its body sideways sufficiently to adversely affect the balance and stability and control of the bicycle.

The headrest attachment 12 comprises a forwardly and upwardly inclined tray 78, on which a resilient pad 80 is retained by means of snap fasteners (not shown) to allow the child to rest its head on the headrest attachment 12.

As shown in Figure 10, the headrest attachment 12 is secured to the seat 10 by a bolt 82, the head of which is received in a recess 84 (Figure 6) in the underside of the seat 10, washers 85 and 86 and a nut 87, and has a slot 88 which receives the bolt 68 so as to allow the headrest attachment 12 to be displaced together with the seat 10 when the latter is adjusted in position along the front support bar 17 as described above.

With the above-described invention, the support device 14 and the seat 10 with its headrest 12 are fixedly secured to the bicycle frame 16 and cannot be dislodged, even if the bicycle falls sideways to the ground. Since the child occupying the seat 10 is restrained by the harness 76, the child is thus securely held in position on the bicycle. If required, the bicycle can be ridden with the seat 10 and headrest 12 removed, in which case the support device 14 remains fixed in position on the bicycle frame 16.

The front and rear clamping devices 30 and 26 enable the support device 14 to be readily attached to a wide variety of bicycle frame tube diameters and the longitudinal adjustability of the support device 14 enables it to be attached to a wide variety of bicycle frame types and sizes. The present child carrier attachment can therefore be readily and

securely mounted on a wide variety of men's and women's bicycles without interfering with brake and derailleur cables on the bicycle frames.

By positioning the child carrier in front of the parent and behind the handlebars, the above-described attachment permits an interactive ride of the parent with the child with the objective of increasing the educational opportunities for the child and increasing the "bonding" between the parent and the child. The carrier is positioned such that the parent can readily observe the physical condition of the child and constantly monitor its changing needs. The child can be readily placed in or removed from the carrier with minimal risk of causing the bicycle to topple and the rider can readily mount or dismount from the bicycle with minimal risk of destabilizing the bicycle and causing the bicycle and its attached carrier to topple. The head support can support a resting child while the child is being transported in the child carrier and permits the adult rider to monitor the resting child and readily respond to the child's requirements. The child carrier is positioned so to minimize the effects of the child's weight or movement on the balance and stability/control of the bicycle. The child carrier can be easily and securely attached to its bicycle and readily transferred from bicycle to bicycle. The carrier attachment is applicable to the majority of adult leisure and recreational bicycles and does not interfere with the operation of brake and/or gear cables which may be on the bicycle. The secure attachment permits the child carrier to sustain a reasonable impact from any direction without causing the child carrier to be dislodged from its point(s) of attachment or causing the child carrier to rotate about any axis passing through the point(s) of attachment.

As will be apparent to those skilled in the art, various modifications may be made to the above-described embodiment within the scope of the appended claims.

For example, instead of the longitudinally extensible and contractable elongate support of the above-described embodiment, it would alternatively be possible to employ an

elongate non-extensible support bar, in one piece, with the front and rear fasteners adjustable in position on this support bar, either with the front and rear fasteners in longitudinal alignment with the support bar or with the support bar offset laterally relative to the front and rear fasteners.